



## MARCH MEETING - Cellular Communications, Part 2

This month, club member Colin Lodge, G4IIK returns to the rostrum to continue his description of the inner workings of the remarkable analogue system that controls the operation of Mobile Phones.

In this age of technological advancement, the mobile phone must hold the record for rapid expansion, not only in terms of high street sales, but also for the innovation in radio communication techniques which now provide a standard of reliability which was never thought possible compared with land-line telephones.

Colin will bring many of the hardware items contained in a typical base station which he says "don't look like radio modules but they are" these should help us to understand the advances in mass integration which is now used to make radio circuits more reliable. Digital systems will also be briefly described.

The meeting will open at 7.30pm, in the Marconi College, Arbour Lane, Chelmsford. See you there.

### DATES FOR YOUR DIARY

4/5 March VHF/UHF CONTEST - RSGB 144/432MHz.

7 March CLUB MEETING - Cellular Comms - Colin, G4IIK.

11/12 March LONDON AR & C SHOW - Picketts Lock.

4 April CLUB MEETING - Gallimaufry - Geoff, G3EDM.

### Les Turner, G4CUT

Sadly we have to report that Chelmsford Amateur Radio Society Vice President Les Turner, G4CUT passed away suddenly on the 6th February, aged 64 years.

Les gave a great deal of support to our Society, serving on the Committee 1969-79, was Newsletter Editor 1973-74 and Chairman 1976-77. He was elected Vice President in 1982.

While holding the call sign G8CUT, he became interested in contest activities and served on the R.S.G.B. Contest Committee from 1973 to 1979.

Later he was privileged to be one of the first fifty holders of a permit to operate on the reinstated 50MHz band.

Les was a very well respected amateur and when his health permitted was always glad to give a 'helping hand' to new and old alike, he will be sadly missed.

## MEMBERS NEWS

Congratulations to Eddie Henrard who has passed the R.A.E., his callsign is G7TYM.

This month we welcome 6 new members, they are Ron Kitchen a S.W.L., Peter Cott-G3BDV, Les Barclay-G3HTF, Wally Mills-G3MCO, Reg Holborn-G6OWG and Philip Broadley GØHSN.

## HINTS AND TIPS - Colin, GØTRM

When making your next sheet metal enclosure for your latest project (think constructors competition!) when making holes to fit the top to the bottom or the sides to the front by using self tapping screws do not drill the holes in the receiving metal try punching them out instead. Using this method a certain extra amount of metal will remain around the hole giving the screw a greater apparent thickness of material to bite into. This method requires a little experimenting first, try drilling a small hole to start with and then use a thin pin punch or a hard nail such as an OBO nail. (Protect your eyes). The material to be punched must be on a firm hardwood base or similar with a suitable hole ready drilled slightly larger than the punch in use.

## COMMITTEE MEETING

The next Committee meeting will be held at 7.30pm on Wednesday 15<sup>th</sup> March, in Telford Lodge, you are welcome to join us.

## LAST MONTHS MEETING, Part 1 - Colin, GØTRM

Chris, GØIPU began his excellent demonstration of JVFX by giving us a brief history of Slow Scan Television (SSTV) and how it started. Back in 1958, one Capthorne McDonald, WA2BCW, while at the University of Kentucky, published a paper "A Slow-Scan TV System for Image Transmission" which used low cost components, including a surplus radar tube (5FP7) to reproduce black and white pictures in an eight second scan which with the long persistence would hold the picture long enough to view until it scanned again.

Various analogue improvements were made over the years before the advent of digital processing with home computers such as the Spectrum and the ubiquitous BBC (which was very good but suffered from lack of memory). Numerous dedicated systems were also available such as the ROBOT 400.

Colour systems followed using three sequentially sent frames of RED, GREEN and BLUE (RGB) of which the best were selected and superimposed. Another method involved using three separate ROBOT 400's to give the colours required. A German amateur Volker Wraase, DL2RZ then developed the line sequential colour system which improved things.

ROBOT then made the 1200 which had it's own colour standards, it was however, Martin Emmerson, G3OQD who developed the colour system that has become the standard used today and has become known as MARTIN mode. The scan sequence is SYNC, GREEN, BLUE, RED.

Eddie Murphy, GM3BSC developed a similar line sequential system to Martin's, it has become known as SCOTTY mode; the sequence for this however is GREEN, BLUE, SYNC, RED; unfortunately this does not decode correctly in JVFX as it produces an underlining in Red.

The ROBOT 1200 is no longer in production, but clones exist such as the SUPER SCAN 2000 and 2001.

With the advent of fast computers and JVFX, things have taken a leap forward with SSTV and FAX communication becoming readily available at a very modest cost (after the computer).

For SSTV, Martin Mode is in common use here but in the USA the SCOTTY mode is also popular.

As FM-FAX and AM-FAX transmissions are used, reception methods vary. FM-FAX is received using an SSB receiver set to USB and tuned to 1.9kHz below the required frequency. If the receiver has a FAX setting then this difference will be allowed for.

For AM-FAX an FM receiver is required. In this mode an FM transmitter is modulated with an AM modulated sub-carrier (mostly 2400Hz). The intensity information of the picture is controlled by the level of this AM sub-carrier, as a result the receiver audio output level is used to optimise the picture contrast. (continued) ☐

## Last Months Meeting (continued)

HF Weather Fax known as WEFAX uses an Index of Co-operation (IOC) of 576 or 288 and a drum speed or lines/minute (LPM) of 120 as standard although some east German stations use an LPM of 90.

Fax pictures are also sent from Polar Satellites such as NOAA and METEOR using IOC's of 576 or 267 and LPM's of 120 and 240, these can be received using a wide bandwidth VHF FM receiver.

The same FM receive conditions also apply to the Geostationary Satellites such as METEOSAT but in the GHz range.

**Computer Requirements:** Although these are not very strict, certain points must be born in mind. Generally 286, 386 or 486's can be used with speed of 12MHz and above. Graphics cards are necessary supporting SVGA (the only video mode now supported). EMM386 should not be used with a comparator type interface such as the well known Hamcomm version as this will give compatibility problems due to interrupts: DOS-6.0 or 6.2 can be used but avoid multi-tasking, i.e. Windows.

Because JVFX uses the COM ports in a non-standard way only genuine 8250, 16550 UART's should be used as some add-on COM port cards only emulate these chips, giving unpredictable results. Regardless of the type of interface used be it the HAMCOMM or the much more expensive commercial interface such as the EASYFAX or MEFAX, keep all leads as short as practical.

As with most complex programs, JVFX is complex and much care and time is needed to configure the system. Intensity, Addr & IRQ, LSB-SSTV, Modulator, Video, Graphics, Clock Timer Frequency, (important one this), Max Interrupt Frequency are just a few of the many requirements.

As there are so many parameters to set they cannot all be shown in this report but Chris has very kindly made available, for other users, all the settings he uses (Copies from G0TRM), some of these will vary with computer types.

With the technical points out of the way Chris continued with a convincing display of the capabilities of JVFX. To produce actual pictures a file convertor program is needed to convert BIT map files to GIF files and in this case the ALCHEMY program was used. We were first shown a picture Chris had received on 2 Metres the quality of which was outstanding.

A live picture transfer was then set up with Charles, G0GJS (another enthusiastic JVFX user) sending slow scan pictures from the back of the room to Chris on 2 Metres. The tones used for transmission could be clearly heard and were very distinctive. The picture which built up line by line took some 5 or 6 minutes to complete. Received pictures are automatically filed and given a serial number.

For these pictures TIF 24 bit files with a million colours and GIF 8 bit files with 256 colours are used, or so I believe.

A demonstration of FAX was next and in this case the link was automatically established. Again tones could be clearly heard but were quite different from SSTV tones.

Currently there are not that many suitable pictures available for transmission but this will no doubt improve with time. Pictures can be derived from photographs via a CD-ROM or from a video camera or other source using the technique called 'video grabbing' with a Video Blaster card.

While Chris presented a 'Video Show' of pictures he had received on both HF and 2 Metres, our President Roy, G3PMX (yet another enthusiastic user and there are more) showed some original pictures he had received on a floppy-disk from Peter, DK7SP made with his recently acquired video-still camera. These had been printed on Roy's EPSON Colour Printer and were of photographic quality showing that brilliant material can be made available for transmission.

JVFX was written by Eberhard Backeshoff, DK8JV in his spare time and has taken him several years to perfect to its current state, (version 7). If all the documentation supplied on the disk is read, it becomes obvious just how much effort and a knowledge of many topics has been applied to producing this program. It is believed other versions will follow to improve things even more.

Chris made it sound all very straightforward in his excellent demonstration, but I am sure much hard work went into the preparation, together with many hours of configuration.

Many thanks to Chris for this introduction to 'pictures by radio' 90s style and to Charles and Roy for their support. A special thanks to Chris from me for the kind loan of his excellent lecture notes and subsequent help.

① Roy has an original of Copthorne's paper if any member is interested.

## LAST MONTHS MEETING, Part 2 - John, G3VMJ

After JVFX and the tea break we enjoyed a discussion with Fred, G2HNF on the RF NOISE BRIDGE.

This report owes much to the fact that I had the presence of mind (unusual that) to slip forward from the rear most corner position in the room to occupy Freds recently vacated chair.

We were reminded that, among the privileges conferred by ownership of an amateur radio licence, we are unique in being able to construct transmitting equipment and use it on the air without gaining type approval. Because of the complexity of modern equipment many of us forego this privilege and buy the factory made product. We should however be able to fabricate some of the more simple accessories. The RF Noise Bridge slots neatly into the category of "kitchen table" projects and is, despite its simplicity, capable of fairly complex analysis of the properties on an HF aerial. In addition to aerial measurements the bridge may be used in other applications including checks on baluns, coax, and silent tune up of the ATU. The instrument comprises two sections in one case: The Noise Generator and the RF Bridge Circuit.

The Noise Generator consists of a cascade amplifier to raise the level of wide band noise obtained from a reversed biased junction. Care must be taken to prevent any tendency to self oscillation and the earth (negative supply) connection should be very substantial.

The RF Bridge contains a toroid which is the most critical component circuit and should be wound upon non-magnetic material (such as a short length of plastic tube) to form the two inductive arms. The remaining arms are both resistive and capacitive and include the variable components behind the front panel controls. The bridge side of the instrument should be built onto a copper ground plane to which the RF connectors are also bonded.

Fred soon passed around some bits for us to inspect and kept the talk practical in nature, also demonstrating some measurements with a distinct noise null on his receiver.

At the conclusion the Chairman suggested that the forthcoming constructors competition should include a separate Noise Bridge section which Fred might judge.





Although the frequency range discussed on this occasion lay between 3.5 and 30MHz, I notice that the VHF UHF Manual, fourth edition, page 11.19 describes the construction on an instrument "to give reliable performance to cover 200MHz and may still be useful up to 432MHz". This may be of interest to those members who don't indulge in steam radio.

A folder of constructional information for the HF version will be available from the club library shortly.

Thank you Fred for an interesting and very useful presentation.

### Editorial note:

We make no apologies for dedicating the majority of space in this edition to the reports of the last meeting. The subjects are so absorbing and we are grateful to the scribes for placing them on record.

A small amount of material is still in hand and we ask the authors to bare with us until future editions, in the mean time, please send more of the same, by any mode     to make us happy ☺

73 from Roy & Ela Martyr,  
G3PMX & G6HKM

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